FIRE PREVENTION AND FIRE RESISTANCE.

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IN dealing with a subject of such universal importance, I cannot hope to say anything new to the members of the Institute. But it is sometimes possible to gain fresh lights on a familiar problem by gathering together its different features to consider them in their bearing one upon another. This is perhaps specially the case with so complicated a question as this of fire prevention, and one in which so many conflicting interests are involved:

I propose to consider, first, to what extent the prevention of fires can be aimed at, or how far our efforts should rather be directed towards lessening their destructiveness. I shall then endeavour to touch briefly on the various means which can be employed for both purposes, with a view to comparing the chief characteristics of these, their relative advantages, and also any practical difficulties in the way of their employment. My object throughout will be to bring forward for more prominent discussion than has perhaps yet been given to it, the question not only of the number and value of methods already devised for fire protection, but also of the extent to which these are available for practical use.

I.—FIRE PREVENTION.

It is well to form an idea at the outset as to how far it is really *Fire Prevention* that we are aiming at. We cannot hope, for the present at any rate, to put a stop to all destructive fires, and the large proportion of "unknown" and "personal" causes which figure on all fire returns would seem to show that by far the larger number are beyond our power to prevent. My own experience in the matter is roughly summed up in the following table :—

Causes of Fires.	Per cent.
Faulty construction of flues, hearths, and grates	15
Defective gasfittings and electric-light installations, and faulty lamps	10
Other causes (curtains, clothes, children, personal carelessness, and incendiarism)	60
Unknown	15
	100

These figures are of course only a rough approximation, which it would be interesting to compare with the experience of others. The only important point, however, for the moment, is to note the comparatively small number of fires which are literally within our power to prevent. The "unknown" causes can obviously not be dealt with, nor are the "personal"

ones much more satisfactory. I have made no attempt in these latter to distinguish between accident and design, as every assessor knows the impossibility of obtaining conclusive evidence of incendiarism, however suspicious the circumstances may appear. I have seen incendiary fires estimated at one in seven both in American and English tables, but, personally, I should not be prepared to put the proportion quite so high. I have been very much struck, in looking through my own tables of fires surveyed this year, to find what a large proportion—rather more than one in nine—have been caused by children. This seems to suggest that a certain number, at any rate, might be prevented by more careful training of children in the matter. I should personally be inclined very strongly to support the idea, which has been brought forward of late, that a course of instruction in fire dangers and precautions should be included in all children's education, from the School Board upwards.

The bulk of these "personal" dangers are, however, clearly beyond our control. The fires due to mechanical or constructional causes are the only ones which we can hope definitely to prevent. And these are well worth careful consideration, on account both of their importance in many cases and also of the large extent to which they can be guarded against. A striking proof of this is afforded by the Glasgow fire returns for the years 1876–86, *i.e.* before the introduction of the Buildings Regulation Act. These tables give 27·8 per cent. of fires as due to defective hearths and flues, as against 9·65 per cent. in London during the same period.

I will touch briefly on the chief points to be noted with regard to these constructional, and therefore "preventable," causes of fire.

1. DEFECTIVE HEARTHS AND FLUES.

These are the most important of all constructional causes of fire, on account not only of their frequency, but also of the serious amount of damage which may result. This is specially the case in country mansions, where fires not immediately extinguished usually have time to spread beyond control. Defective flues and hearths are found to account for a large majority of fires in the country; especially, of course, in old houses. I note this as showing the importance of insisting upon all possible measures of safety in the construction, repair, or alteration of chimneys and flues in country houses. With reference to chimneys, especially in old houses in London, the flues which were sound enough for the old-fashioned open kitchen range are found defective, in respect of their withs and chimney-backs, for the modern close kitchener, which creates great and concentrated heat.

2. TIMBER MANTELPIECES

constitute another source of risk from the way in which they are frequently fitted with the metal of the grate touching the wood. In fixing the mantelpiece there is often left a small pocket in which soot accumulates, and may become ignited. I myself lately came across a new and very expensive London mansion which was set on fire in this way. Fortunately the outbreak was soon discovered, and extinguished without great damage.

3. WALL-PLUGS FOR JOINERY

must also be regarded as sources of danger when near flues, especially in old houses where the pargetting of the flues has worn away, and the joints of the brickwork have become open.

4. UNUSED FIREPLACES.

Another risk, though not very frequent, is worth mentioning, as it is often liable to be overlooked. I refer to the practice of boarding up unused fireplaces, or making them the

receptacles of scraps of paper and other inflammable materials, which may easily be set on fire by a spark falling down the chimney from some other flue. Even without the extra risk of the paper, the soot which is sure to fall down and accumulate has been known to cause a fire. Section 88 of the Glasgow Building Act deals with this point in the following regulation: "Every fireplace-opening or chimney-opening which contains no grate or stove, which is not used as a fire-place, or which may hereafter become disused as a fireplace, shall be stopped up with incombustible material, and the chimney-top shall be stopped up with like material. The provisions of this section shall apply to new and existing buildings other than dwelling-houses."

5. GAS AND GAS-FITTINGS.

There are comparatively few fires due to these causes, in my experience—perhaps, 6 per cent. Also in the majority of these cases there is no actual fire damage, but only explosions.

6. ELECTRIC-LIGHT FITTINGS.

I have known few losses caused by these; but it must not be overlooked that the general installation of electric light is still recent. We have yet to learn whether danger is to be found when the wiring and fittings become old.

With regard to causes of fire generally, it is worth noting that it is in the most destructive outbreaks that these are hardest to trace. The proportion of fires classed as "unknown" is much larger in serious than in slight cases, owing to the fact that all evidence from which one might learn the origin has been destroyed.

II.—FIRE RESISTANCE.

Fire Prevention, strictly speaking, is, as I have tried to show, only practicable in about 25 per cent. of our present outbreaks. It is therefore obvious that the question which claims our most immediate attention is that of *Fire Resistance*.

Fire resistance is of course a relative term, and the degree of perfection to which it can be carried depends not only on the building itself, but also on its contents and immediate surroundings. This has to be kept in mind in considering the question, as it is useless to expect owners to spend large sums on "fireproof construction" which they are perfectly aware will benefit their neighbours rather than themselves.

The two chief elements in fire-resisting construction are:—

(*a*) The materials used.

(*b*) The general design of the building and details of construction.

A.—Materials used in Fire-resisting Construction.

It is unnecessary to enter into a detailed discussion of different building materials, which are all well known to members of the Institute. I propose therefore only to touch upon such features of each as may affect the present question.

1. *Brickwork.*

With regard to building materials, there is no doubt that good brickwork is the best known to us for fire resistance. The chemical composition of the clay is the great element in determining both the fire-resisting and weight-carrying properties of a brick. These depend chiefly on the proportions of silica and alumina in the clay, and, secondly, on the oxide of iron, lime, magnesia, potash, &c. "Uncombined silica, if not in excess, is beneficial, as it

preserves the form of the brick at high temperature. In excess it destroys the cohesion, and renders the brick brittle and weak. Twenty-five per cent. of silica is a good proportion." *

2. *Terra Cotta.*

Terra cotta, used for structural purposes, may be porous or hard-burnt. Porous terra cotta is made by the addition of some combustible material, such as sawdust or finely chopped straw, to the pure clay, which is then burnt under great heat. By this means the straw or sawdust is consumed, leaving the clay in a porous state, and thus reducing its weight as a building material. Hard-burnt terra cotta is made from pure clay without the addition of any combustible substance. Whereas the porous form is in itself non-conductive of heat, the hard-burnt terra cotta has to depend greatly on the hollow spaces with which the blocks are moulded, and is liable to crack on being suddenly cooled. On the other hand, the porous make does not carry weight so well as the solid; and if the straw or sawdust has not been thoroughly burnt out of it, there is also a danger of disintegration under the combined effects of fire and water. Any unconsumed fibre that may have been left serves to absorb the water, and if this is poured on when the terra cotta is greatly heated it is converted into steam, and causes damage by expansion. But for the protection of girders or columns, where it has little or no weight to carry, the porous form seems the best.

3. *Mortar, Plaster, and Cement.*

The following figures are the result of a series of tests with cement mortars for the Sanitary District of Chicago in 1896. These tests were made with briquettes, composed some of neat cement and some of mortar made of cement and sand. After having been heated to a great temperature they were allowed to cool gradually, and were then broken in the testing-machine. The average results were as follows:—

Percentage of loss of original strength due to heat exposure.

Natural cement.—Neat, 89·3, mortar 1 to 1. 61·0.
Portland cement.—Neat, 58·2, mortar 3 to 1. 69·6.

From these experiments the following opinion was deduced:—"It may be that concrete floors will, after a fire test, hang together under heavy loads, but these experiments indicate that they are nevertheless weakened. The extent of weakening may depend upon the duration of the application of the heat. In any event it does not appear that cement-mortar can be relied upon satisfactorily to resist high temperatures. It may do so in some cases where the structure before heating was inordinately strong." †

It is probably true that common lime and sand mortar in small quantities has greater fire-resisting properties than any other plastic material, and would be a better protection than cement mortar if it were strong enough to be used to a thickness of, say, four inches or more.

I was very much struck a year or two ago by the way in which an ordinary plaster ceiling had checked a fire. I had to visit Jesus College, Cambridge, to inspect a damage in one of the old buildings. The fire had broken out in the upper floor, and had burnt away the ceiling. But above this was a ceiling of much older date which had sagged a great deal Obviously, the lower one had been put in for the sake of appearance. The old ceiling was of very thick plaster, and had checked the spread of fire. Otherwise the roof timbers must have been attacked, and the whole range of buildings would probably have been destroyed, and the

* *A Treatise on Masonry Construction*, J. O. Baker. † Freitag, *Fireproofing of Steel Buildings.*

old chapel adjoining seriously endangered. I was greatly interested, by the way, to note that the old ceiling had been made on little bundles of rushes fixed to the ceiling joists in place of the ordinary wood laths.

4. *Concrete.*

The above-mentioned tests with Portland cement have been taken by the upholders of terra cotta to prove that concrete is unreliable in great heat. I do not myself consider this opinion to be justified, as these tests had reference only to tensile strength. Tests have been made with concrete in which the material has been subjected to as much as 1976° F. for several hours, and has been allowed both to cool slowly, and also suddenly, by application of water. The report shows that generally the concrete composed of sand, gravel, or stone mixture crumbled, or gave signs of great weakness, while that composed of cinders "showed good coherence," and "did not suffer" by wetting while hot. The highest degree of coherence was found in a mixture of 1 part cement to 7 of coarse cinders. These tests would suggest that where concrete has been made with care and knowledge it will stand very high temperatures for a long period, even with the application of cold water.

5. *Stone.*

I feel it is unnecessary to say anything on this material, for it is too well known that all stones will fly or disintegrate when subjected to even only moderately high temperatures.

6. *Wrought Iron, Cast Iron, and Steel.*

Although non-inflammable, none of these are good fire-resisting materials when unprotected, and the necessity of casing them in some fireproof covering is now universally recognised. I shall touch upon different kinds of covering later on.

Unprotected iron rapidly absorbs heat, and although the material itself may not have suffered permanently from the application of extreme temperature, yet owing to its great conductivity it may by expansion cause serious damage to the building. It is well to remember that steel will expand 1 inch in 125 feet for every 100° F.

Cast-iron, however, will stand and carry its loads after having been subjected to a considerable temperature.

7. *Wood.*

In dealing with the question of fire-resisting construction, the fact must not be overlooked that in the fitting-up of the building for its use a considerable amount of combustible materials must be employed. It is obviously important that these should be used as sparingly as possible. Shelves, for instance, might in many cases be made of wire netting supported on metal uprights; and the counters in large stores might be constructed on the principle of fireproof doors and shutters. The counter-top itself would probably have to be of wood, but the other parts could have a wood core covered with sheet metal.

These are important points to consider, as inflammable partitions, screens, counters, and fittings of all kinds may in themselves make a fire fierce enough to damage the best constructed fire-resisting buildings. It is, however, clearly impossible to eliminate the use of wood altogether, and it is therefore worth while to inquire into the possibility of rendering it non-inflammable.

The process is well known by which wood and even textile fabrics can be treated with this object, and careful tests seem to prove that they can be made efficiently fire-resisting. It is also claimed that the wood is not injured for structural purposes, and that the effect of the treatment is permanent. But the expense is a somewhat serious item, the process adding

about 30 per cent. to the cost of joinery in soft woods. Although it might be employed to advantage in important buildings, one can hardly hope to see it come at present into general use.

A fact which might well be made more use of than it is at present in building is the excellent resistance which timber in balk will offer to even a severe fire. With large beams I have very seldom found fire to have penetrated more than one inch.

B.—Design, Construction, and Fittings.

These are the most important questions of all in the problem of fire-resistance. Inflammable materials may be the means of seriously injuring a "fireproof" building; but errors in design and construction will cause what might have been a small fire to spread over an unmanageably large area, and to gain force enough to work practically unlimited destruction. The well-known "Horne Building" fire in Pittsburg was a striking instance of this, as also, on a less destructive scale, the recent fire at the Haymarket Stores. In both of these cases the fire spread through a lift shaft, which served as a flue on a large scale; and similar cases might, as we all know, be instanced in great numbers. To my mind the problem most immediately before us in this question of fire-resistance is the treatment of all such vertical shafts or openings in the interior of buildings.

The different purposes for which such well-holes are requisite render different treatment necessary for each. It will be, therefore, simplest to consider them separately.

1. *Well-holes and Light Shafts.*

In many instances great care is taken to build floors fire-resisting, and to cut off stairs from large areas, while unprotected windows are left opening into narrow well-holes, thus forming a vulnerable spot for attack.

Well-holes are usually enclosed over the ground-floor story by skylights, the glass of which soon cracks and breaks with the heat, and the well-hole becomes a large flue, causing an immense up-draught. It does not seem to me possible to eliminate entirely all shafts from large factories and warehouses, especially in crowded districts where space is very valuable. It is therefore most important to see by what means the dangers inherent in such features may be reduced.

This, I think, can to some extent be done by a more universal use of shutters. In factories and warehouses this is quite possible, for business terminates at a definite hour of the day, and the whole building is under one management. But in office property, where there are many tenants, any systematic method of closing would be found very difficult and would cause great inconvenience to the occupants.

For instance, the Vanderbilt Building in New York was set on fire by the burning of the Nassau Chambers, which was about 40 feet distant from a wing of this building. The flames broke through the windows, all of which were fitted with iron shutters, not one of which was closed.

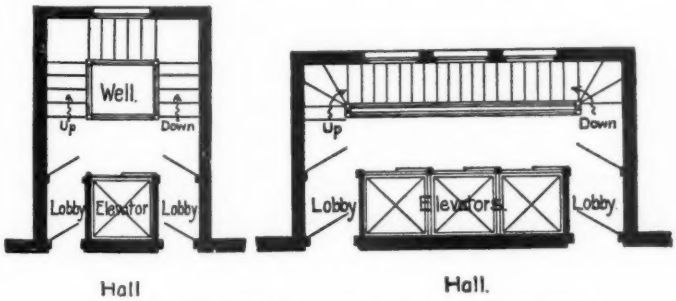
The use of wire glass in iron frames for skylights in well-holes seems to be very desirable, helping to prevent the fire from bursting through from below or burning embers falling in from above. Wire glass is made by embedding in the centre of sheets of rolled plate glass, whilst incandescent, woven wire of one inch mesh in the familiar diamond form. The combination of the two materials forms a splendid substance to withstand not only great heat, but also the sudden cooling when water is poured upon it. The wire, being protected by the glass, holds the latter together even when cracked. This glass seems admirably suited not

only for skylights, but also for warehouse windows overlooking narrow well-holes or streets, where the appearance is of small importance.

It is contended by some that skylights should be made of thin glass, thus allowing the quick escape of smoke and gas. Smoke in large and dense volumes is inflammable and may cause fire to spread from place to place. It may also from its denseness prevent the firemen from locating the seat of the fire. I personally am inclined to think that more danger is to be apprehended from spread of fire, than the possible disadvantage to the firemen by the presence of dense smoke.

2. *Well-holes for Stairs and Lift Enclosures.*

My remarks on well-holes for light are in many ways applicable to these features. Judged solely from the standpoint of fire-resisting design, the usual position of staircases and lift shafts in mercantile offices and hotels is wholly wrong. Great advantage would be obtained if such well-holes could be enclosed by fire-resisting walls, with access to large floors or corridors by doorways only, which could be fitted with fire-resisting doors. The walls enclosing well-holes for stairs and lifts should be carried through and above the roof in the same manner as party walls, and the skylights over should be of plate glass (not less than a quarter inch thick) or preferably of wire glass.



PROPOSED ARRANGEMENTS OF ISOLATED STAIR- AND ELEVATOR-WELLS.*

It must, however, be admitted that by such isolation of the staircase much of the internal effect of a building would be sacrificed, and the question must reduce itself to whether appearances must be sacrificed for the rather remote chance of fire.

After the great Pittsburg fire, the appraisers in a report recommended as follows:– "We would advise that all stairs and elevator openings be enclosed on all sides (excepting the doors) with tile protection, and with an extra rolling shutter which can be closed when not in use, and at the time of fire."

But to me fireproof doors would appear preferable to shutters. These latter are often found not to be in working order when most needed, nor can they be easily opened again for the escape of a person who might have been unfortunately cut off by the premature closing of the shutter.

Lift doors in large retail stores would necessarily require glass panels in order to see whether customers are waiting to be carried, but such panels could be of small dimensions and be of wire glass. In order to check the rush of flame up a shaft a system of automatic sprinklers might be fitted round the sides of the opening near the roof, or perhaps perforated pipes in connection with an outside standpipe might appear preferable.

As to the material of the stairs themselves, it is well known that stone stairs crack and break after being subjected to a comparatively slight heat on a sudden application of cold water. Teak or oak steps of 2-inch tread and riser would possibly resist fire for a longer period.

* From *The Fireproofing of Steel Buildings*, by J. K. Freitag, C.E. Chapman & Hall, Ltd. London, 1899.

But in cases where stone steps are used and supported by iron carriages at each end, a safe staircase might be made by firmly fixing under the treads, from carriage to carriage, an iron plate of openwork pattern, which would support the tread even when fractured.

I am inclined to think that a staircase made of oak or teak, with 2-inch treads and risers and soffit, and the spandrels filled in solid with some hard wood, would be found the most reliable.

3. *Subdivision of Large Buildings.*

One of the most important considerations is the subdivision of large areas. A fire in a large undivided area increases both in intensity and volume with much more rapidity than in a smaller one. There is no doubt much difficulty in arranging such subdivisions in large warehouses, factories, and stores. In large retail stores unobstructed areas are considered of great value, and in factories and warehouses large spaces afford convenience for the insertion of machinery and the ready handling of materials.

In domestic and even in office property there is not the same difficulty, for the areas will of necessity be divided into rooms or offices, and this can be done with fireproof partitions.

4. *Fireproof Floors.*

There are now many excellent systems for the construction of fire-resisting floors, all well known to members here. The two main divisions into which the systems may be classed are:

1. Concrete. 2. Terra cotta or brick.

Experts differ greatly as to which makes the better floor, but after considering many opinions one comes to the conclusion that each may be good or bad according to the quality of the materials and workmanship.

The Engineering News, dated February 1897, in commenting on the New York tests, says the following:

Our knowledge of both the strength and the fire-resisting qualities of tile floors is confined almost entirely to the results of experimental tests. Many of these have been made, and their results may be fairly summed up by saying they have shown hollow tile arches, of good design and not too long span, to have a strength sufficient to be safe under any load likely to be brought upon them in any ordinary building; also, that their resistance to fire is entirely satisfactory, except that the dense tile is likely to go to pieces if struck by a stream of water when heated. This has been shown by actual fires in fireproof buildings of tile construction, as well as in experimental tests.

Turning now to floors made up of cement concrete and steel, we know that properly designed arches of this material have an enormous strength, much above that of tile arches of equal weight and span. Until recently, however, there has been rather a small amount of knowledge as to the fire-resisting qualities of such constructions, and while many able engineers asserted that concrete would resist fire, other authorities denied it. We may fairly say, however, that this question has been effectively settled by a series of tests.

. . . . . .

Some half-dozen tests have now been made of concrete floor construction, and although the conditions of the tests are exceedingly severe, not one of these floors has failed.

An important point to insist on is that no space should be left underneath the floor-boards which might serve as a passage for fire, or to form a home for rats and mice. These animals have been known to carry into such spaces matches, oily waste, or other combustible materials liable to be ignited by steam pipes, or even by spontaneous combustion.

Wood fillets also are unnecessary even where wood floors are used—the nailing of such floors can be made directly into coke-breeze concrete. In warehouses, stores, and the like, it is very important for the floors to be watertight, and an arrangement of scuppers or spouts

might be made to carry water off through the walls. These would be fitted with metal lids to open outwards, in order to prevent the inward current of cold air. This might be the means to some extent of preventing the damage by water to the floors below.

5. *Fireproofing of Columns and Girders.*

The main features for a satisfactory fire-resisting covering for columns and girders are :

1. The best non-conductor of heat.
2. Should be able to withstand the action of fire and water.
3. Should not break away from the column under the action of fire and water.
4. Should contain no joints through which fire could find its way.

The covering may be of plaster, concrete, brick, or terra cotta. It is hardly needful to remark that metal lathing should only be used where plaster is adopted for the covering material, and it is a good thing to first wrap the column with asbestos lining bound with wire. In mercantile buildings the column should be protected from the floor to a height of 4 feet by a metal guard, to prevent the fireproof covering being broken away by collisions with trollies and such like.

Where terra cotta is used for protection, the porous variety is preferable to the hard-burnt. The latter, as has been stated before, is likely to crack if water falls upon its heated surface. The porous form is a poor conductor of heat, and will withstand to a great extent the application of cold water even when very hot.

6. *Fire-resisting Partitions.*

These may be divided into three kinds—

1. Solid plaster partition.
2. Hollow plaster partition.
3. Terra-cotta or porous brick partition.

In America there is a good form of solid partition made. The studs consist of $\frac{7}{8}$ inch channel iron, 16 inches from centre to centre. These are secured at the bottom by nails or staples to a $\frac{7}{8}$ inch or 1 inch wood strip, which is laid on the concrete floor, arch or slab ; and at the top by staples driven into the ceiling. Wire lathing, stiffened with $\frac{1}{4}$ inch solid steel wires or ribs woven in every 7 inches, is laced to one side of the studs with galvanized wire. The sheets of lathing are so placed as to make the stiffening ribs run at right angles to the studs. The partition is then plastered with some hard plaster or lime mortar gauged with plaster of Paris. This is applied in five coats. The total thickness of the partition is 2 inches, and the weight is 20 lbs. per square foot.*

A partition which withstood with excellent results a test made by the British Fire Prevention Committee was made of terra-cotta wired lathing fixed to the floor and ceiling, and covered with three coats of plaster on each side, in which plaster of Paris was incorporated. The partition was $2\frac{1}{2}$ inches thick when finished. The dovetail corrugated sheeting seems an excellent material for the foundation of a thin fireproof partition.

Of terra-cotta partitions little need be said, except that it is most important that all such partitions should start directly upon the masonry of the floor. The terra-cotta blocks, however, should be of sufficient width to secure stability. I feel that some of the sections suggested by various firms are not quite thick enough. A good section is one in which the blocks are moulded with grooves and tongues ; by this means additional stability is given.

* Freitag, *Fireproofing of Steel Buildings.*

7. *Insertion of Gas and Steam Pipes and other Fittings.*

Special attention should be given to protecting all openings made through floors for the passage of pipes for steam, gas, or any heating apparatus. This may be done by a metal sleeve to take the pipes; all open spaces to be stopped with asbestos or other fireproof substance. Care must be taken to leave not even the smallest channel through which a fire might spread.

It is hardly possible to insist too strongly on the necessity of protecting not only doors and windows but also smaller openings, such as are made for pipes, belts, shafting, and the like. These are often overlooked, because they are small and are probably not part of the original design.

A short time ago I had a singular experience of the spreading of a fire by means of these unsuspected danger traps. I inspected a loss in town, at a house about a hundred years old. I was told that severe damage had resulted. I inspected the ground floor, where the fire had broken out in a cupboard in the dining-room. From the appearance on this floor and on the next, only slight damage from fire, smoke, and water, seemed to have occurred. On the second floor I could trace nothing but smoke and water damage, and thought the loss much exaggerated. It was greatly to my surprise, when I came to the third floor, that I found the chief part of the roof burnt off. I was at a loss to understand how the fire could have spread from the ground-floor to the roof with so little damage to the intermediate floors. On further examination I found that the chimney-breast from the first floor upwards had been battened out to make the chimney openings central, thus forming a regular flue directly over the cupboard in the dining-room. A lamp not properly extinguished was shut up in this for the night, and had set fire to the contents near, and burnt through the ceiling into the space in the chimney-breast above. From this point the flames must have rushed up the vertical opening as up a flue, burning the studding on the way, and breaking out fiercely on the roof.

I do not consider that matters concerning the Fire Brigades come within the scope of this Paper, and, with regard to private apparatus as aids for fire-resistance, I propose only to say a very few words on the principal aids, namely:

1. Automatic alarms.
2. Automatic sprinklers.
3. Stand pipes and hose.

Automatic fire alarms usually depend on the fusion of a metal link, which causes an electric circuit to be made or broken: by this means the alarm is sounded. Some very interesting and highly satisfactory tests were made by the British Fire Protection Committee with the Pearson Fire Alarm in July of last year.

Manual apparatus is often fitted with the automatic fire alarms, so that the occupants themselves may on an outbreak of fire sound the alarm. These can also be used to give the alarm of a neighbouring fire.

Automatic Sprinklers.—For warehouses, factories, and wholesale and retail stores, and, of course, for all kinds of mills, automatic sprinklers are a great safeguard.

To make the installation effective, the building must be open in construction, so that the water from the sprinklers can reach the whole of the floor; the pipes must be of sufficient size, and must always be under pressure; and the water supply must be of sufficient quantity and pressure.

The sprinkler heads should be placed on the ceiling every 10 feet, so that each head will have to cover 100 square feet.

I have tried in the foregoing remarks to bring forward one by one the main features in the difficult problem of fire prevention and resistance. My object in this has been not to enter into any detailed discussion of these, but to bring them together into focus, so to speak, so as to make it easier to estimate their bearing on one another and on the whole question. For the more carefully one goes into it, the more apparent it becomes that the real problem is not to be solved merely by devising further improvements in the details of materials, construction, or design. We are, as I have tried to show, already admirably equipped in these respects, and modern inventions are continually adding to our resources. If fire resistance were the only point to be considered in building, there would be practically no insuperable difficulty in securing it. But the questions of appearance, expense, and space demand at least equal attention. Owners of hotels and large retail stores require first and foremost a showy effect; while in city warehouses economy of space is of paramount importance, and in all cases the question of cost naturally comes to the fore.

Fire-resisting construction, in its present stage of development, does undoubtedly involve a considerable increase of expenditure, coupled in many cases with a sacrifice both of space and of artistic effect. The practical problem, therefore, before members of our profession, is how best these drawbacks may be minimised.

One cannot doubt that there is still much to be done, in the way of design and construction, to introduce the fire-resisting features already suggested without undue sacrifice of effect or increase of cost. A discussion on this subject would be of great interest, and I would venture to suggest that a useful basis for it might be afforded by giving as a subject for a students' competition the designing of a hotel, retail store, or mercantile house, on fire-resisting principles, having special regard to internal effect in the first two cases, and in the third to economy of space.

I should like to note, in conclusion, that I have purposely refrained from all consideration of Building Acts, or of Insurance, as being beyond the scope of this paper.

REPORT OF THE SCIENCE STANDING COMMITTEE ON THE FIRE OFFICES' REGULATIONS FOR STANDARD FIRE-RESISTING BUILDINGS.

Read by Mr. H. D. Searles-Wood [*F.*], Hon. Secretary of the Committee, at the General Meeting, Monday, 30th March 1903.

In 1898, after the Cripplegate fire, a conference of architects and insurance surveyors held two meetings with a view to ascertain what reduction of premiums the Insurance Companies would allow if buildings were constructed under the following conditions:—

1. If buildings are flat-roofed, with hard fire-resisting material.

2. If floors of iron and concrete, constructional ironwork covered with fire-resisting material, say as required by the London County Council regulations, floors connected only by staircases, which, with the landings, to be enclosed by fire-resisting material, such as cement on metal core, now much used; lights in these partitions to be sheet plate; teak or oak doors, and treads and risers.

3. Similar floors, but pierced for lift, enclosing walls of brick rising through roof, and openings on each floor protected by light iron shutters.

4. Wood floors and joists pugged four inches between joists with some fire-resisting material, pierced for staircases, constructed as in No. 2.

5. Pugged floors as above, with lift in addition, lift enclosed with fire-resisting partitions as staircase in No. 2, and with iron doors.

6. If the lighting areas or well-holes common to buildings in different occupations be carried down to the basement floors and not roofed over by skylights on the ground floor.

7. If windows in front and back wall fitted with iron sashes and frames but left without shutters.

8. If opposing windows, within say twenty feet, are fitted with iron shutters or some fire-resisting material for blinds.

Any other heads or points which the Offices may desire to note or which are set out in existing tariffs.

At a second meeting a tariff was submitted in which a normal building with a minimum rate was given, and the rate increased to meet ten or twelve different modes of construction.

This tariff appeared to be in form and principle exactly what the Committee had been endeavouring to obtain from the Offices, and they were strongly of opinion that if the insurance offices regulate their premiums on any principle whatever and agree upon a tariff among themselves, it is only fair to the insurers and their advisers that such tariff with clear definitions should be available for public use, but this was not agreed to.

Since this conference some rules for standard fire-resisting buildings have been issued by the Fire Offices Committee, and have appeared in our JOURNAL,* and the Science Committee have given them careful consideration.

The rules are numbered I. and II. No. I. applies only to cotton mills, flax mills, woollen mills, and worsted mills. No. II. gives rules for standard fire-resisting buildings, not including those scheduled above.

From a careful consideration of these rules it would appear that they have been drawn up without reference to the London Building Act 1894, and in several points the rules differ from the provisions of the Building Act.

It would greatly facilitate business if these rules could be made to accord with the Building Act, and if the Fire Offices Committee would draw up a tariff which would be available by the public where the normal building should be the type allowed under the Building Act, with ten or twelve varieties of construction or arrangement, whereby the normal rate would be reduced.

We recommend the Council to approach the Fire Offices Committee, to ascertain whether they would meet a Committee of the Institute to discuss these rules and tariff, with a view to making them workable. It is the general experience that the rules as at present drawn do not encourage fire-resisting construction.

Mr. SEARLES-WOOD added: The tariff now in use, as I have said, takes the ideal fire-resisting building as the normal and treats the variants as increasing the premium. We think that it would be much simpler if we could show our clients a tariff arranged on the basis of a building in accordance with the Building Act and the variants as reducing the rate. As an example, if sprinklers are adopted a reduction of 15 per cent. of the premium will be allowed, and so on. Had I been in a position to do so, I would have moved that this Meeting request the Council to approach the Fire Offices Committee to ascertain whether they would meet a Committee of the Institute to discuss these rules and tariff, with a view to making rules and tariffs that would encourage fire-resisting construction.

* JOURNAL R.I.B.A. 11th January 1902, p. 116.

DISCUSSION OF MR. PORTER'S PAPER.

Mr. John Slater, B.A.Lond., *Vice-President*, in the Chair.

Mr. THOMAS BLASHILL [*F.*] proposed a very hearty vote of thanks to Mr. Horace Porter for the very valuable Paper he had given them. Some of it consisted of a repetition of principles which had been dinned into the ears of architects and persons concerned with building for a very long time, but they could not be too often repeated. The Science Committee had very carefully considered what kind of report they should make on the matter of the Fire Offices Regulations, and he hoped that the Council would be encouraged by that meeting to act upon it. With regard to what Mr. Porter said about tests, in his (the speaker's) opinion tests were valueless, or next to valueless. A great number of such tests were made by the manufacturers of the article to be tested. One scarcely met with a single case in which the material to be burnt was not drenched with paraffin. That was absolutely fatal to a test. If one attempted to light a fire in a kitchen grate by first of all pouring paraffin on to the wood, the oil would blaze away very fiercely for a few minutes and then go out, but might not light the fire. As far as he had had the opportunity of advising the Fire Prevention Committee, he had recommended them to avoid this fallacious kind of testing, and to test the material as nearly as possible in the condition in which it was likely to exist. He should like to ask Mr. Porter if he could give them any more practical information upon such questions as concrete floors. He had been using them in London for fifty years or thereabouts. The composition of the floors they knew; but they wanted to know the behaviour of those fireproof floors in an actual fire. If Mr. Porter could get together some information as to what had really happened in a big fire where those concrete floors were seriously attacked, it would be extremely valuable. He could fully corroborate Mr. Porter's remarks about the danger of hollow partitions; they could not be too careful to avoid hollow partitions or shafts of any kind concealed in the construction of a house. They were sure to carry what was called a fire haze; that is to say, an exceedingly hot vapour which was produced by the fire below, and which would burst into flame as soon as it reached the fresh air. He hoped they were coming to a time when they should cease entirely the construction of buildings with wooden floors and floors that were not fire-resisting. He had been able to construct floors quite as economically of steel and coke-breeze as they could be constructed of good wooden material, and it did seem at this time somewhat behind the age to be erecting buildings of combustible materials in places where houses were close together. As far back as 1861 and 1866 he remembered seeing fire-resisting floors used as a matter of course in the buildings of Paris, when we had hardly begun to use them in England. He hoped that legal pressure would be brought to bear more strongly upon constructors in order to make buildings more nearly fire-resisting. Would Mr. Porter tell them the exact meaning of cinders? He assumed that the term was meant to cover coke-breeze, which was one of the safest of materials, especially when put together with cement in the proportion given. Burnt ballast was another good thing. Concrete made of flint ballast was the most easily disintegrated of all the usual classes of materials of which concrete was made.

Mr. GEORGE E. MEAD (of the Sun Fire Office), who was invited by the Chairman to speak, said that the subject which Mr. Porter had dealt with so admirably was of a more technical nature than he, being neither an architect nor a surveyor, was qualified to speak upon. He might say on behalf of the Offices, although he was not commissioned to speak for them, that they were always ready to be interested in and listen to suggestions coming from the Institute. In respect of the remarks which fell from Mr. Searles-Wood upon the report of his Committee, he was not able to pronounce anything officially, but any communication which was made he had no doubt would receive from the Fire Offices Committee proper attention. The proportion of causes of fire quoted by Mr. Porter was not such as he could altogether fall in with, that is, as to the number of incendiary fires. He thought all statistics which would attempt to fix upon any proportion were fallacious. Incendiary fires were very often so complete as to leave behind them no trace whatever as to their origin. Sometimes the perpetrator showed that he was altogether a novice at it. He would plant fires in different parts of the building, soak the material in paraffin, and then set light to the material. The result was a good deal of smoke, and then the fire went out. The police came in, detected the various heaps, and were able to pronounce very fairly upon the character of the fire. But there were a good many who knew better how to do it. Speaking from a good many years' experience in an important Fire Office, he had come to the conclusion—and it was greatly to the credit of this country—that the proportion of incendiary fires was small. They might judge of them, not only by the fires themselves, but by the way in

which the claims were compiled after the fires. These they were able to scrutinise, and the result of their scrutiny was that they were fairly made, as a rule, and betrayed no evidence of fraud, which would be found if the origin of the fires was of an incendiary character. He should like to join in the expression of thanks to Mr. Porter for the great care which, from his treatment of the subject, he had so obviously bestowed upon his Paper.

MR. BLASHILL said he should like to add a word on the question of incendiarism. It was very much impressed on his mind some forty-five years ago, when he was disturbed at three o'clock in the morning by a fire in an eight-roomed house. A man who had had two or three fires before got a bushel of fire-wheels and made half-a-dozen fires of them about his house, and opened the back windows. The whole of the fire-wheels had been laid up against doors and other eligible places; but when the police got into the house all the fires were going out; not one of them had set light to anything else. And that was the work of a man of experience!

MR. LEWIS SOLOMON [*F.*] said he had much pleasure in joining in the vote of thanks to Mr. Porter. The recommendation of the Science Committee would serve a very valuable purpose. He had frequently had occasion to wait upon the Fire Offices with reference to claims, and, although they did not print matter for the use of architects, they had printed forms which they lent to architects; and the various surveyors were extremely kind in giving information, not only when they were applied to, but they took the trouble to examine architects' drawings and send them suggestions which could be acted upon for reducing the premiums. So it was not from any want of good feeling that the insurance offices did not always fall in line with architects. He thought, however, that a suggestion might be made to them to act with a little more business tact. After the Cripplegate fire, for instance, several of the owners of property wished to restore their buildings in a fireproof manner, with stone or teak stairs, and concrete floors, and everything of a most substantial kind. Naturally they applied to have the premium reduced to some extent, but they were told no reduction would be made. No doubt a good fire was a good advertisement for an insurance company; but supposing they saved 20 per cent. by having the building fireproof, if they only allowed a quarter of that amount to the person who built the premises, it would pay them in the long run. It was found in all other businesses that to give the purchaser a share of the profits led to improved business. As regards staircases, he thought that teak would be a very good material to use; but would the County Council allow it to be used in factories instead of what they recommended? He doubted it. He had tried at times, but they would not consent to it. His own impression was that a teak staircase would be far better than a stone one, both for fire-resistance and for safety as well. Mr. Porter had not mentioned anything about concrete stairs. Nine tenths of the fireproof stairs in London were built of concrete, and his impression was that concrete was far better than stone, though not nearly as good as teak. The plan of a staircase and lift exhibited by Mr. Porter would not apply in London, because it did not comply with the requirements either of the County Council or of the fire insurance companies. The companies asked—and reasonably—for a space of 6 feet between two sets of doors, so that a fire should not spread. The plan exhibited did not show anything like as much. The County Council required newel walls to staircases, but the plan exhibited did not show a newel wall. Those matters required consideration. With regard to the fallaciousness of the ordinary tests, some years ago some material was brought to him as being fireproof, and the man laid out some of the material and lit a fire on top of it to show how perfect it was, and the fire did not burn through; but when some of the material was taken and thrown into the fire it burned like a piece of coal.

MR. HENRY LOVEGROVE [*A.*], District Surveyor for South Islington, Shoreditch, and Norton Folgate, said he had a good deal to do with fires; there was a saying that when the Fire Brigade started, the horses' heads always turned towards Shoreditch. He had noticed that a good many fires occurred somewhere about quarter day in some of the smaller factories. He did not know whether they were incendiary fires, but he had no doubt many were caused by the alien workmen smoking cigarettes in the workshops and throwing them down anywhere, perhaps into a heap of shavings. With regard to sprinklers, he had seen a great many put up, at an enormous expense, with a hideous tower above the building, necessitating costly piers in order to carry the enormous cistern required. It appeared to him that if a fire broke out in the upper floors the lower floors would be deluged with water, and an immense quantity of stock destroyed. A friend of his, a large owner of mills, and a great believer in sprinklers, held that the theory of 10 feet apart was wrong; sprinklers, he said, should be 8 feet apart. This gentleman also thought that the alarm given at the time of the sprinkler starting would be a certain warning for the men to attend and turn off the water. He should like to know Mr. Porter's opinion on the water damaging the goods below. In the buildings with which he was most intimately connected—large furniture stores—immense damage might be done by water pouring down upon the goods. He should like to ask Mr. Porter about the question of rushes. He had seen a great many ceilings which had been con-

structed on rushes. He did not know when that practice started; it would be a matter of antiquarian interest to find out. Concrete staircases, he thought, were the very best kind. Stone staircases came to grief most disastrously, as he had known in one or two theatre fires, and an infirmary fire two or three years ago. He agreed with Mr. Blashill that coke-breeze concrete was a first-rate material. It stood very much better even than a good ballast concrete floor. The iron girders and stancheons should be protected in some way. There, again, Mr. Porter touched on a weak point. The other day, in a building constructed of everything to make it fire-resisting—with the girders cased and the columns cased—he found every floor filled in with partitions and fittings of ordinary deal, which would be most inflammable in the case of fire. He should like to ask Mr. Porter what he and other surveyors thought of those armour-plated doors called Dowson, or some such name. He had often been urged to allow them to be fixed, and had always refused. They had just fixed them in a place he was connected with, and he had had them taken down. He insisted on the doors being iron, according to the Act.

Mr. T. LEWIS BANKS [*F.*] said there was no doubt that concrete was being more and more used, not only in floors, but in all kinds of construction. When the Cardiff Merchants' Exchange was burnt down, he went to see the effects of the fire on an ordinary concrete floor, and found that the concrete went into holes in several places, and that allowed the flames to go from one story to another; consequently the whole building was consumed. Had the concrete been armoured those pieces of cracked concrete would not have fallen down; and it would have been very much safer. The same principle applied to concrete stairs. The Midland Hotel now being built in Manchester was, he supposed, the most scientifically fireproof structure of the hotel class that had ever been built in this country, and the principal staircases there were concrete staircases in the first instance: they were all armoured in the way he had mentioned, and were afterwards covered with marble. He mentioned this as a fact which had not been referred to by the lecturer and others who had spoken. There was a material, not much used, which he thought was the best fire-resisting plaster: it was made of slag from the hematite furnaces. The objection to this hematite slag was that it set very slowly; but if carefully selected and ground as fine as flour, it would be found to set much harder than any Portland cement, though much more slowly.

Mr. MAX CLARKE [*A.*] said he wished to add his thanks to Mr. Porter for the very admirable Paper. Anyone who had read a Paper at any time knew the trouble it entailed. He hoped Mr. Porter would not mind if he made some criticisms on the Paper. In the first place Mr. Porter seemed to fall foul of the word "fire-prevention." He had given them an analysis of the various accidents by which fires occurred. It might be taken that all fires were the result of accident, except those few which were the work of incendiaries; and the term "fire-prevention" was intended to convey that the fire should not assume importance. That should be the generally accepted meaning of the term. That being so, he thought Mr. Porter should have gone into the question of how fires should be prevented attaining the undesirable importance they so frequently did. Mr. Porter had given a very clear description of defective hearths and flues; but what they wanted was some method of obviating the defects. In the North, and in Ireland, nine-tenths of the chimney flues were built with terra-cotta or fire-brick linings, which he thought were almost unused in London. If they were more generally used, a great number of the fires which occurred through defective flues might be obviated. He threw that out as a suggestion. Then the Building Act (which Mr. Porter had not mentioned, although it had an important bearing on these matters) permitted one to drive plugs and iron holdfasts into chimney breasts, entirely ignoring the fact that the iron holdfasts might get red-hot and set fire to skirtings, &c. It was news to him that gas created only explosions. "Only explosions" he took to be a good means of creating fire. Whether it was a purely fire insurance matter he did not quite understand. But supposing a fire to be caused by an explosion, would the insurance company look upon it as an accident, or would they look upon it as an explosion only and not coming within their risk? A paragraph of Mr. Porter's Paper read as follows: "Fire-resistance is of course a relative term, and the degree of perfection to which it can be carried depends, not only on the building itself, but also on its contents and immediate surroundings. This has to be kept in mind in considering the question, as it is useless to expect owners to spend large sums on 'fireproof construction' which they are perfectly aware will benefit their neighbours rather than themselves." He considered that a most unfortunate remark to be made in the room of the Royal Institute of British Architects. In the first place, he did not consider it to be the fact, and in the next place it would be apt to create an unfortunate feeling amongst people who were going to build. If a man built for the good of his neighbour, when his neighbour came along he built for the good of the adjoining man. If they only looked at it in that light, it would be quite sufficient to make it for the benefit of the building owner. But, on the other hand, a man who built a fire-resisting structure did benefit himself. Of course they must start with the assumption that there was no such thing as a fire-resisting building—at least no such thing as a fireproof

building. They had only to get the material inside, and it made no difference what the building was made of; if the material caught alight it was destroyed. He had with him a short report of the Horne Building fire in which it was stated—and it was a positive fact—that it made no difference how much their steel or other material was covered with non-conducting mediums; in time all the non-conducting mediums were precisely the same temperature as the fire itself, and they communicated it through their thickness to the steel structure. So that, as Mr. Porter said, a building could not be called fireproof except to a certain degree, and that degree depended entirely upon the materials inside. With regard to brickwork, the best fire-resisting brick was of course a fire-brick; but a fire-brick would not stand a great amount of weight, so they had to use the happy medium—a material which would be weight-carrying, and at the same time would not be affected by the fire. In the Barbican fire enormous cracks were caused in the thickness of the brick walls by the excessive heat. Hard terra cotta, again, when it was heated, and water put upon it, was absolutely useless. With regard to concrete Mr. Porter said: "Tests have been made with concrete in which the material has been subjected to as much as 1976 degrees F. for several hours, and has been allowed both to cool slowly and also suddenly by application of water." He should like to know where those tests were made. He had written reports upon several tests which were made lately, and he would like to compare the results of these. With regard to ballast he differed from Mr. Blashill, because ballast was *not* a good material. At the Theatre Royal, Glasgow, where a fire occurred a good many years ago, the corridors were all made of concrete, the aggregate of which was ballast. It became very hot, and when the water was put on the majority of the floors fell down. When they made floors of ballast at the British Fire Prevention Committee's station, and put water on them, they fell down, usually in layers, as regards their thickness; but the coke-breeze concrete, although absolutely incandescent through its thickness, did not fall down. It seemed pretty certain from their experiments that a coke-breeze concrete floor, if not of too large an area and with sufficient thickness to protect the ironwork, was fairly good fire-resisting construction. He had noticed that cast iron would carry its load perfectly well in fire so long as the water was not applied; but when the water was applied cast iron was a very dangerous material. He understood that the best treated wood added 90 per cent. to the every-day cost. He was supplied with a quotation some time ago at 6*s*. a foot cube. That was for deal, and the price quoted would put it on a par with the best hard wood. He had a report, not yet published, on a test of oak and deal floors. As it applied to a certain extent he would refer to it. The posts were solid deal posts and beams overhead. The following was from the report: "The centre post measured 13 inches by 18 inches at the bottom and 13½ inches by 13½ inches at the top, over the charred surface, and was charred to an average depth of 1¼ inch. The transverse beams measured 9 inches wide over the charred surface, and were charred to a depth of 2 inches." At the Theatre Royal, Glasgow, during the fire the timber beam over the proscenium wall was burnt completely through. It rested upon the wall 3 feet at each end, and the whole of the thickness of the timber was burnt right through the ends, so that the light could be seen through it; there was a space of 7 or 8 inches at each end. That, of course, occurred from the brickwork round it having got red-hot, and the timber burning away by degrees through the red-hot brickwork. Heavy timber construction was almost insisted upon now in Hamburg. The Hamburg warehouse construction was entirely of oak, and the only danger was where it was put together with these massive bolts, which was a point to be considered. Timber construction was extremely dangerous as regards smoke. The enormous quantity of perfectly black smoke which was emitted, by oak at any rate, in burning was a great source of danger. At the fire in Brownlow Street, some time ago, the place was not burnt down, but the oak timbers in the basement were burnt, and the three inhabitants were suffocated by the smoke. In the case of the test by the Fire Prevention Committee—the second floor—there was sufficient smoke to asphyxiate the people all round. No discussion on fire prevention was complete without considering the lives of the people; and if one did that at all one must consider, not only their being burnt, but their being killed in any other way. Referring again to the Horne Building fire, the original fire did not occur in the Horne building; it occurred in Jenkins's stores adjoining, and after that the fire was communicated to the Horne building through the top of Jenkins's building. He would read an extract from the report: "According to the best available information the night watchman for T. C. Jenkins's grocery store first became aware of fire while making his rounds at 11.45 p.m., but it was some little time before he finally located it in a barrel of paper, rags, scraps from the employés' dinner baskets, and similar refuse, which stood at the bottom of the elevator shaft. For some time—about fifteen minutes, as estimated by the watchman—he fought the fire with a chemical extinguisher. Finding his efforts to be to little purpose, and the flames rapidly ascending the elevator shaft, the watchman sent in a call for the fire department." The report went on to say that the fire people were there for some time, and the fire got to the top of the lift shaft, being fed by

the stores of oil, &c. "The firemen had for some time previously abandoned the hope of saving Jenkins's building, and had turned their streams upon the large dry goods store of Joseph Horne & Co., and the neighbouring office building also belonging to Joseph Horne & Co. Despite their efforts, however, the woodwork of both these buildings near the tops began to burn at about one o'clock." The fire went right up the elevator shaft and set fire to the Horne building at the top. Of course that would be obviated in most of the buildings of the warehouse class if the lift shaft were surrounded with brickwork, and if the openings were fitted with fire-resisting doors. He was not a believer in Dowson's, or anybody else's, armoured doors—he thought they were a mistake—nor was he a believer in an iron door which was not adequately fastened. The Building Act said there must be an iron door here and there, but said nothing about the fastening. He was very pleased to see Mr. Porter's design for the staircase and the lift shaft, and he hoped he would be able to appropriate the idea very shortly! With regard to teak staircases, if they had a solid teak step, or a solid oak step, with a fairly good thickness in the waist, it would be, he thought, a perfectly fireproof material. But if they built a wall round the staircase which complied with the County Council factory requirements at the present time they would have something very nearly approaching what one might call fireproof as distinct from fire-resisting stairs. There should be absolutely nothing on the staircase of a combustible nature, then there would be nothing to destroy the staircase. With regard to the six-foot space which the insurance companies would like them to put between fire-proof doors, he thought that was asking a little more than they would get. He should like to say a word for a favourite material of his—slag wool. Slag wool was the best non-conducting and most fire-resisting substance obtainable. He had patented a fire-proof curtain for theatres made of this material, and he was confirmed in his theories by an experiment made by the Fire Prevention Committee with a partition made of slag wool. Some wooden uprights were packed with slag wool and subjected to fire for two hours, and except for the burning off the boarding from the outside, it did not make the slightest difference; it was just as good, so far as the partition was concerned, at the end of the experiment as at the beginning. He therefore advocated slag wool as against asbestos for covering columns, because in the first place it was a better non-conductor of heat, and in the next it was very much more economical.

THE CHAIRMAN (Mr. John Slater, *Vice-President*) said there was no doubt that fire prevention and fire resistance were two totally different things. As Mr. Max Clarke said, one could not prevent a fire occurring, whatever one did, because the causes of fire were beyond the control of the people who constructed the building. What architects and builders had to do was to make the buildings as far as they could to resist the fire which was almost certain to break out in many kinds of buildings sooner or later. He was much struck by the statistics Mr. Porter gave from the Glasgow fire returns showing the benefit derivable from really good construction in the way of hearths and flues. He did not think Mr. Porter laid quite enough stress upon a matter which had been hinted at by Mr. Max Clarke—namely, the extreme importance of making the roofs fireproof. If the roof of a building were made of concrete and asphalte, he believed the spread of fire would be resisted to a remarkable extent. He agreed with Mr. Max Clarke that unless cast iron was protected, as soon as water was turned on to it it was practically useless. With regard to the staircase, the plan of which was shown by Mr. Porter, it seemed to him that Mr. Solomon in his criticism of it rather mistook the purpose for which it was intended. As he (the speaker) understood it, a staircase of that sort was intended to make the upcast shaft through which the fire was certain to go practically cut off from the rest of the building, and for that purpose it seemed admirably designed. The only fault he found with it was that there were winders at the bottom, and there was a flight eighteen steps long. Of course that did not accord with the regulations of the London County Council with regard to any fireproof staircase. It always seemed to him an exceedingly curious thing that the London County Council should lay down in very many particulars such exceedingly stringent regulations, which had to be complied with literally in every respect, and yet that a man might build a warehouse five or six stories high with simple wooden joists, and no ceiling at all, if he liked. That seemed to be a matter which there ought to be some regulations to prevent, because one might have one's fire-resisting staircase perfectly good, but, considering the materials stored in a great many factories and workshops, the fire would break out, and would rise from floor to floor in an incredibly short space of time if there were no ceilings, as there were intended to be, but simply the floor-boards between the joists to prevent the fire passing from floor to floor. He could not help thinking that if instead of having these, in many respects, vexatious restrictions as to technicalities, the County Council were simply to pass a resolution that every building of the factory and workshop kind must be so constructed as to satisfy them that it was fairly fireproof, it would do a great deal of good. In conclusion he would only say that although Mr. Searles-Wood was technically unable to bring forward the resolution of recommendation to the Council, he was quite certain that after the expression of opinion at

this meeting the Council would be only too pleased to adopt the recommendation the Science Committee had sent up, and would endeavour to induce the Fire Offices to meet them and see if they could not bring about some consistent tariff.

MR. HORACE PORTER, in responding, said it had been a great pleasure to read the Paper, but he quite felt that there were many shortcomings in it. Such a Paper as this, on such a difficult subject, he had found most difficult to write. With regard to what Mr. Clarke said as to the tests and the 1900 odd degrees, these were conducted by a Commission of the City of Hamburg in 1895, a full report of which would be found in "Materials of Construction," by J. B. Johnson. With regard to concrete stairs and concrete floors, referred to by Mr. Blashill, he was afraid he could not personally give any account of a floor that was damaged simply through the concrete. Mostly the fireproof floor was damaged by the exposure of the ironwork in it, and it went from that cause, and not through the concrete.

9, CONDUIT STREET, LONDON, W., *4th April* 1903.

CHRONICLE.

Legal Registration of Architects.

The following letter and memorandum have been addressed from the Institute to the Presidents of the Allied Societies :—

28th March 1903.

DEAR SIR,—A circular headed "A Government Diploma for Architects" having recently been forwarded to all members of the Profession, we are instructed by the Council to forward for your information the subjoined Memorandum which has been carefully considered and approved by them.

In the event of any further steps being taken towards legislation in the matter the Council will be prepared on learning the particulars to forward an amplification of their views.

And in the meantime, after you have ascertained the general opinion of your Society, the President hopes that you will be able to meet him in conference with the other Presidents of Allied Societies on matters vitally affecting the interests of Architecture throughout the country.

We are, dear Sir, yours truly,

ALEXANDER GRAHAM, *Hon. Secretary.*
W. J. LOCKE, *Secretary.*

Memorandum.

The Council of the Royal Institute of British Architects have had under their consideration a circular headed "A Government Diploma for Architects."

The circular gives but little indication as to what is proposed, but states that "it may not be possible, nor is it essential, at the present juncture to be unanimous on the *details* of any scheme of registration, but until it can be shown that uniformity exists on a *principle* so vitally affecting the public interest and Architectural practice it will be practically impossible to induce Parliament to grant facilities for the discussion of a private measure."

It is very difficult to say exactly what these words mean, but they, no doubt, refer to some form of legal registration, and the Council feel that it is impossible fully to explain their views on such a question as this without more knowledge of the details.

If this diploma is to prevent anyone who does not hold it from designing buildings, would not such a scheme meet with irresistible opposition, not only from many Architects, but also from the Institutions of Civil Engineers and Surveyors? And what chance would there be, even if it was thought desirable, of passing any such measure if it meant that Engineers must design no more bridges or railway stations, and Surveyors no more buildings on the estates which they manage?

If, on the other hand, the idea is to prevent anyone who does not hold such a diploma from calling himself an Architect, would not Engineers, Surveyors, Borough Officials, Auctioneers, and Estate Agents be left as free as at present to carry on architectural work? This quite apart from the still more important question whether it is possible by any legal registration to decide which man shall call himself an Architect and which shall not.

Again, is it not certain that there is a large body of influential Architects, both within and without the Institute, whose opinions we value, who doubt the possibility of deciding by legal registration who shall and who shall not be called an Architect, and who further doubt the advantage it would be to the art of Architecture? These again would oppose successfully any such scheme.

Architecture claims to be one of the liberal arts, akin to the art of the Painter, the Sculptor, and the Musician; and if they do not seek protection from the charlatans in their respective arts, why should we?

The Institution of Civil Engineers has lately started an examination, but relies on the influence of its own Institution to give it value without going to the Government for aid. Cannot we do the same?

If legislation is required to protect the public from bad construction, it should surely be directed against the speculative Builder rather than the Architect, and take the form of some building examination for all engaged in superintending such operations; but if the idea be to protect the public against bad art, can any legal registration do this?

Ought we not rather to devote our energies to making the Royal Institute of British Architects more truly representative by so encouraging the higher education of our young men that their superior attainments may raise the standard of our art and increase the confidence of the public in us?

Could we not then trust in ourselves and keep the training of Architects and the regulation of Architectural matters in the hands of Architects themselves, who surely know best what is required, without tying our hands with Parliamentary interference?

Caerphilly Congregational Church Competition.

The Cardiff, South Wales, and Monmouthshire Society have been striving to secure fair conditions in this competition. The most unsatisfactory clause is No. 7, under which the successful competitor is to be paid a commission of 5 per cent. for all the "usual professional services of an architect," including the taking out of quantities. The total amount of money available is £2,300, which is to include the architect's fee. Two other clauses, 8 and 9, dealing with the adjudication, needed comment. At the request of the Cardiff Society, a letter was written from the Institute to the promoters. The latter gave a satisfactory reply with regard to clauses 8 and 9, but refused to alter clause 7, saying they could not afford to do so, and further that they find it is an ordinary condition and similar to what has been put in and agreed to in a number of other cases. The promoters have now issued to intending competitors what purports to be a copy of correspondence between the Cardiff Society and themselves, *but leaving out all reference to clause* 7. The Cardiff Society very properly characterise this document as misleading, and have requested their members not to enter for the competition. It is to be hoped that no member of the Institute will be a competitor.

Architects' Responsibilities.

Under the heading "Architects' Responsibilities" in another column is reported an action tried in the Lord Mayor's Court in which a firm of wood-flooring manufacturers were plaintiffs and Messrs. Herbert H. Law and Sidney T. Harris [*A.*], architects, of Northampton, defendants. The question apparently was one that had never been before the Courts previously. As will be seen, the actual issue between the parties was but a trifling matter; the principle involved, however, is of the utmost importance to architects and their clients, and one that must be steadfastly maintained, not only in their interests, but in the interests of commercial morality. The architects, in a letter to the Institute setting out the facts of the case, state that their chief reason for taking the trouble and going to the expense of defending such an action was to uphold the power and authority vested in members of the profession, and they ask that publicity be given to what they believe to be an unprecedented case. Messrs. Law and Harris and the profession generally are to be congratulated on the successful defence made in the case.

The Abuse of the Term "Renaissance."

Baron Henry von Geymüller [*Hon. Corr. M.*] sends a copy of his communication on the above subject to the French Association for the Advancement of Science at the Archæological Congress of 1900. It is entitled *De l'Abus du mot de Renaissance comme dénomination de Périodes de l'Art ou de Styles*, and has been reprinted from the original report and issued in leaflet form. The following is the text:—

L'auteur désire appeler l'attention sur le danger qu'il y a à qualifier de "Renaissances" des styles qui ne renferment pas les éléments indispensables à la Renaissance:

UN ÉLÉMENT ANTIQUE ET
UN ÉLÉMENT DE L'ART GOTHIQUE.

L'abus de ce nom éminemment juste pour désigner un fait unique dans l'histoire du monde, fausse l'intelligence des phénomènes et rend plus difficile leur étude scientifique et historique. Les périodes et styles qu'il ne faut pas considérer comme des Renaissances sont:

En Italie: les différentes tentatives des écoles romanes (pisane et toscane, aux XI^{e} et XII^{e} siècles, et celles des Cosmates, plus au midi et à Rome).

En France: 1^{o} la merveilleuse éclosion de l'art gothique, aux XII^{e} et XIII^{e} siècles; 2^{o} l'école franco-flamande et le naturalisme réaliste de la Flandre, du nord de la France et de la Bourgogne, au XV^{e} siècle.

Les tentatives italiennes ci-dessus sont des essais de *relèvement* latin, de *renouveau* latin, de *reprise* de formes latines. Il leur manque l'élément qui, seul, aurait pu les rendre viables et produire une véritable Renaissance.

L'éclosion de l'art gothique est, d'une part, beaucoup plus qu'une Re-Naissance, d'autre part, c'est quelque chose de plus limité et restreint. Ce style et son esthétique ont eu la gloire d'introduire dans le monde quelque chose d'absolument nouveau et sans précédent. Ce n'est donc pas une Re-Naissance, mais la "Naissance" première et

glorieuse de l'Art basé sur l'étude de la nature du Nord, de l'Art français proprement dit, ou du premier art véritablement français, en même temps l'Art national de tous les peuples gallo-germains.

L'Art franco-flamand, loin d'être l'origine d'un nouveau style, celui de la Renaissance, est l'expression dernière d'un style qui finit. C'est la forme la plus libre, la plus complète, la plus intense de la psychologie, du goût et de l'esthétique gothiques.

Ce qui manquait aux écoles toscanes et romanes était le contraire de ce qui manquait aux écoles franco-flamandes. Aux premières il fallait un ferment gothique qui n'était pas encore né; aux secondes, un ferment italo-antique. Sans le mariage de ces deux esthétiques, jamais il n'y aurait eu de Renaissance.

La Renaissance commence en grand en Toscane, avec le Dôme de Florence, d'Arnolfo di Cambio, une conception "d'esprit et de proportions *antiques*" dans une robe semi-gothique, comme Saint-Eustache, à Paris, au XVI^e^ siècle, est un édifice gothique dans une robe de Renaissance milanaise et François I^er^.

THE TEMPLE.

WE disburse large sums for dignity in England, and the commodity is generally well worth the price. It is, perhaps, not wholly of free choice that the British public pays dearly for its law, nor are the general citizens of London invited to express their opinion on the economic aspects of a system which houses a costly, but indispensable, profession in incommodious groups of elderly dwellings, ranged, with all the profusion of antiquity, over sites of incalculable value. It may, indeed, be well that the public conscience is not put to the test of so troublous a decision. It is easier and nobler for us to assume as a virtue what is practically a necessity, and to consider, with all the glow of self sacrifice, that the contributions which the law levies at times from even the least criminal of its clients are free-will offerings not merely to the personal welfare of our family solicitor (and his chosen counsel), but also to that department of our city's dignity which in distinction to mere modern amenities we may brand historic and patrician, if not antique.

The enormous wealth which lies buried in the retention of old, inadequate, and wastefully-planned buildings upon the freehold sites of the Inns of Court is, in a very real sense, contributed by the legal fees of those who employ the machinery of the law, and many of us—most of us, I hope—are proud to think that it is so. Probably the present age has more pleasure than had preceding generations in the rambling Georgian tenements which house with such disregard of ground values the gentlemen whose "opinion" is worth so much more than our own.

Indeed, if we were told, some fine morning, that the Benchers of the Temple and of Lincoln's Inn * had come to the conclusion that by judicious rebuilding they could accommodate their present legal tenantry upon one-third of their present sites, and further that the income which they expected to derive from the disposal of the remaining acres was estimated at so high a figure that for the future legal advice would be tendered and legal services rendered free of charge, I truly believe that many of us (perhaps the less litigious of us) would regret the innovation. Free law would be a poor compensation for the abolition of that quaint oasis which makes in so great a degree for the beauty and peace of Central London.

Mr. Bellot, whose book † is here under notice, writes of the Temple from within. It is to him not a place of refuge from other more visibly active spots, but the very centre of work and history. It is in fact "Our House," and naturally he feels to the full that unreasoning but most reasonable conservative affection for the sticks and stones of which the place is made which even we outsiders are glad to acknowledge. Like us, though no architect, he reverences the old, even where its antiquity may be only that of the eighteenth century. Indeed we find him so warm in condemnation of certain modernisms that in a rhetorical attack on the new buildings by the Embankment his prose fairly collapses. It is, to be sure, not wholly as a modernism that Mr. Bellot condemns this building, but rather (as I gather) for the reason that it does not resemble one or other of six French buildings which he enumerates; a criticism which tempts one to ask, by the way, why it should be expected to resemble a French building at all.

Architecturally, Mr. Bellot's book is something of a disappointment. The fact that he heads two of his chapters "Buildings in the Inner Temple" and "Buildings in the Middle Temple" respectively, raises the hope that the buildings themselves are to be described; but the author's interests in this, that, or the other block are mostly human, and he hurries from door to door discoursing not so much of bricks and mortar as of bygone worthies—and unworthies.

Words cost more in the Temple than they do in Conduit Street; it is not therefore wholly becoming for architects to criticise the prose of barristers. Let us accordingly attribute to emotion the broken-backed sentence already alluded to (pp. 294–5), and let us charitably consider that similar lapses in other parts of the book are due to defective proof correction. It will still be no impertinence to ask what Mr. Loftie has done that he should be chastised with a personal pun on p. 210.

* Lincoln's Inn, to be sure, has already modernised a large part of its buildings.

† *The Inner and Middle Temple.* By Hugh H. L. Bellot, M.A., B.C.L., of the Inner Temple. London: Methuen & Co., 1902.

This is enough of adverse criticism. Mr. Bellot's book is meant to be a medley of history, chat, and pictures, and if it be occasionally iterative, and occasionally disjointed, such qualities do not interfere with its intention. The illustrations are various in style. Many are reproductions from old water-colours and prints; others are original, and owe their creation to Miss Wylie, whose handiwork is far from commonplace.

In some ways the most interesting of Mr. Bellot's chapters is the first, which deals with the early history of the Temple, and, indeed, gives the steps by which the present Benchers became the successors of that company of Red Cross Knights who in the first years of the twelfth century owed their existence to the vow of Hugh de Paganis. Such a line of inheritance—or, more properly, of progressive ownership—is full for us modern folk of the mysterious interest which attaches to all such proofs of our own union with antiquity; and the spot most sacred to meditation on this theme, the visible and central habitation of the thought which makes the long continuance of the name "Temple" a reality and not merely an idea, is "the Round"—that circular atrium or narthex of the Crusaders' church, whose very form is a symbol. I would not imply that the Round attests the length of the Temple's antiquity. Far from it. There was a Round before the Round; for the building we admire on the south of Fleet Street is a twelfth-century successor to an earlier church, whose foundations probably lie at the north end of Chancery Lane, somewhere near the Birkbeck Bank. Yet if the church that we know cannot carry its associations back to the very days when St. Bernard gave his blessing to the Order which was in course of time to wander so far from St. Bernard's ideals, the building will at least take our thoughts through seven centuries to the occasion when, in the presence of Henry II. and his court, the ceremony of its dedication was performed by Heraclius, Patriarch of Jerusalem. Even at that date the aristocratic exclusiveness of the Knighthood and its widespread hold upon European society must have brought the rank and wealth of the association into greater prominence than its original functions of assisting pilgrims on their road to the Holy City. Soon we find them established in a new *rôle* as bankers, bailees, and custodians of the wealth of others—a capacity which naturally brought upon them the importunity of kings, to which, at the beginning of the fourteenth century, was added as a culminating oppression the hostility of the Pope. Meanwhile wealth had borne fruit, and had produced among the Templars themselves other qualities than the chastity and obedience to which they were pledged. Whatever be the truth of the charges levelled against them (and there were some who admitted under torture *oscula inhonesta* and *spuitio super crucem*—the latter, strange to say, a part of the ceremony of initiation), there can be no doubt that by this time the Order was a secret society of great wealth, of great extent, and perhaps of great heresy. Accordingly, Rome, urged on by Philip le Bel, crushed it, and in 1312 its goods passed—nominally, at least—to the Knights Hospitallers or Johnnites. That they did not actually so pass in England, spite of a papal decree, was the cause of many disputes; and the settlement of one of these by the return of some wrongly appropriated land was the original cause of the still existing division of the Temple into two properties.

It will surprise no one to discover that the period of disputed ownership was followed by an inrush of lawyers; but, to do the lawyers justice, it should be stated that they came in not as owners but as tenants. They are first heard of as occupants as early as 1320, and, though only lessees of the property, they seem to have had a very creditable idea of how to manage their landlord to their own advantage.

The Reformation was, of course, a death-blow to the Knights Hospitallers but their tenants were not to be so easily disturbed. From 1540 to the seventeenth century the lawyers held direct from the Crown, and when in 1608 there was a wish on the part of James I. to exercise his rights as a landlord by selling the freehold, they bought him off with a mug!—a "stately cup of pure gold" filled with coin. James thereupon renewed the charter, cherished the cup, and presumably spent the money. His successor pawned the cup, and Charles II., having nothing to fall back upon, sold the reversion of the property this time to the lawyers themselves.

So the Red Cross Knights are gone, and the Johnnites are gone, and the Stuart kings are dead, and the golden mug was melted by the Jews of Amsterdam, but the lawyers live on. And, so long as they resist the temptation to make business for architects by building New York sky-scrapers on their once sacred land, good luck to them!

PAUL WATERHOUSE.

CLIFFORD'S INN.

THE quietude and repose of Clifford's Inn, aside from the whirl of busy Fleet Street and Chancery Lane, has at last been disturbed by the notice boards and flaming posters affixed to the Hall, announcing a sale early in May. Another of the links of the past is threatened; let us hope that it will not be let out in building lots and the pleasant garden covered with bricks and mortar.

Clifford's Inn, the oldest Chancery Inn, was

originally the town house of the Lords Clifford, ancestors of the Earls of Cumberland. The messuage was granted to Robert-de-Clifford by King Edward II. in the third year of his reign, 1310. In 1345 the widow of Robert-de-Clifford demised it to students in the Common Law for the rent of £10 annually, and afterwards, by a grant to Nicholas Sulyard, Esq., principal, and other seniors, disposed of the premises in consideration of £600 and £4 per annum.* Stow in his *Survey* succinctly points out the course of reading enforced at the end of the sixteenth century. He says that the Inns of Court were replenished partly by students coming from the Inns of Chancery. From this Inn students proceeded to the Inner Temple.

The present hall, probably built on the site of a former one, is Perpendicular in style; the cusped heads of the three-light windows show a somewhat debased form. The glass is now plain, in small squares, but formerly armorial bearings were to be seen in the glazing. A flat ceiling over, of a late date, may possibly hide an interesting timber roof above.

The walls are panelled up to the sill line and plastered above. The buttery exists on the other side of the passage, with its wide range and stone floor, and lead-light windows. A panel exists over the passage with the initials and date:

P.
W. M.
1767.

It was here that the Commission presided over by Sir Matthew Hale, Sir Orlando Bridgeman, and other Judges, sat, after the Great Fire in 1666, to hear and settle claims of landlord and tenant, boundaries, &c., of the burned houses. Of Sir Orlando Bridgeman, Chief Justice of the Common Pleas, who replaced Clarendon, Pepys in his *Diary*, 31st August 1667, writes as follows: "In the evening Mr. Ball of the Excise office tells me that the seal is delivered to Sir Orlando Bridgeman; the man of the whole nation that is the best spoken of and will please most people, and therefore I am mighty glad of it."

Sir Edward Coke and John Selden were once residents, as also was Harrison, the regicide, a clerk in the office of Thomas Houlker, an attorney of this Inn.

The writer was informed that there was not a suite of chambers vacant, and pending the arrival of the particulars of sale from the auctioneers no decision could be arrived at as to the scare aroused in the minds of those who love their "old London."

W. Arthur Webb.

* In the reigns of Henry IV. and V. it was an independent school for the study of the law, not connected with or subject to the Temple.

THE CASTLE OF VINCIGLIATA.

Mr. John Temple Leader, whose death occurred at Florence, on the 2nd of March last, at the patriarchal age of ninety-three, was, since the death of the late Earl Fitzwilliam, the only survivor of a pre-Victorian Parliament. He was—like Mr. Gladstone and the late Mr. C. P. Villiers—at one time the Father of the House of Commons, having been a member of the first Reformed Parliament, and was returned for Bridgewater in 1835, in the reign of William IV. Mr. Leader resigned his seat in 1837, in order to contest the re-election of Sir Francis Burdett for Westminster, but was unsuccessful; he was, however, elected in July of the same year, when he defeated Sir George Beaumont. Mr. Leader was an intimate friend of Lord Brougham, and, about 1845, he accompanied Brougham to Cannes and settled there, where there is now a Square Brougham and a Boulevard Leader, as well as a statue of Brougham in the Grande Place, and a monument to him in the cemetery where he was buried, he having died there in 1868.

In 1855 Mr. Leader left Cannes and purchased the ruins of the Castle of Vincigliata, a feudal fortress in the territory of Maiano, the birthplace of Benedetto da Maiano, the architect of the Strozzi Palace, Florence, not far from Cave di Fiesole, about two miles N.W. of Fiesole, and about three miles S.W. of Florence, which he proceeded to rebuild entirely, and to fill with bric-à-brac of every description.

This ancient castle was erected in feudal times, and together with the castle of Poggio attested the supremacy of the Florentine family of the Usimbardi, both of which belonged to them. At the commencement of the fourteenth century the castle became the property of the family of Buonaccorsi; and Vincigliata in particular, after having become the property of the Visdomini and the Buonaccorsi, passed, in 1335, to a certain Paolo, the judge, son of Decco di Ceffino da Figline, and finally to the family of the Albizzi, who had intermarried with the Alessandri, and these latter inhabited the castle from the middle of the fourteenth century up to a comparatively recent date. Having been neglected by the owners, the castle gradually fell into decay, until, at the beginning of the last century, it was nothing more than a ruin covered with ivy and brambles. A ruined loggia, upon which was a portion of a terrace, a courtyard enclosed on two sides by crumbling walls, a portion of a staircase, a deep well, a gateway, with a niche over, and a few fragments of masonry scattered here and there, were all the remains of the castle which had escaped the ravages of time when Mr. Leader purchased the property in 1855 from a certain Lorenzo Galli of Rovezzano, who had acquired it of the Alessandri family in 1827.

The work of rebuilding the castle was entrusted to the architect Giuseppe Fancelli, who died during the progress of the works, and whose labours are gratefully acknowledged in an inscription under a bust of that artist placed within the courtyard of the castle.

Signor Fancelli was the son of Mr. Leader's factor or farm agent, and was bred to a country life; but some of his ancestors had been architects or sculptors, one of the statues in the Boboli Gardens, a figure of Vulcan, being by one of them. As soon as young Fancelli was free to choose he abandoned country life and entered the art-school of the Belle Arti at Florence in December 1842. On leaving the Belle Arti in 1849 he was apprenticed to the architect Cav. Mariano Falcini, and won prizes in competitions at Siena in 1851, and at Florence in 1852; he also assisted Cav. G. Baccani, and built the chapel to Mr. Leader's villa at Maiano. He died of miliary fever in 1867 at the early age of thirty-eight.

"When Giuseppe Fancelli commenced this great design," says Lord Lamington,* "it was after a conscientious study of old Italian castles and a great knowledge of the annals of Italian history. He had wandered over many a battlefield and visited many a crumbling ancient hall, and was intensely interested in his work. He was so fortunate as to find drawings of the castle as it had been restored by the Usimbardi; from these he was enabled to discover the line of the ancient walls, and remove all the earth and rubble—the accumulation of centuries. For not only were all the outworks, and the foundations and the exterior defences, mostly buried under earth and rubbish, but even the remains of the towers, the halls, and ruined stairs were hid, or, where exposed to view, were worn away by decay. Trees had taken root in courts once the scene of princely festivities. The whole place when Mr. Leader commenced his operations was very picturesque—a favourite resort for the poet and artist—but very hopeless, if regarded with the view of reconstruction. Mr. Leader had, to aid him, not only the intrinsic merit and skill of the young architect, but the deep interest in all natural works of art, in the love of the beautiful, which is a possession of the Italian people, and which Fancelli possessed in a pre-eminent degree."

An Italian writer quoted by Lord Lamington is not so enthusiastic with regard to Vincigliata as a residence as some English admirers have been when he asserts:

"Come abitazione Vincigliata non sarebbe certamente gradita, dappoichè gli ambienti principali sono troppo oscuri, anzi melanconici, il vano destinato al passaggio troppo ristretto."

[As a dwelling Vincigliata could certainly never be agreeable, inasmuch as the prevailing atmosphere is too dark, as well as melancholy, and the space devoted to the corridors too narrow.]

It is much to be regretted that the owner of the Castle of Vincigliata should have devoted so much time and money to what is after all a sham and a forgery. He might have constructed a villa on the site; but to build a reproduction of a fourteenth century fortress, and to adapt it to the requirements of modern life, was to attempt an impossibility. Reference has been made to Alnwick Castle in Cumberland; but in that case a compromise was effected, and while the exterior has all the appearance of a border stronghold, the interior is fitted up in the Italian style without any attempt to reproduce mediæval features.

JOHN HEBB.

* Formerly Mr. Cochrane Baillie, in an article in *Blackwood's Magazine*, November 1887.

THE BLOIS STAIRCASE.

I HAVE just read in the JOURNAL of the Royal Institute of British Architects last received (Vol. X. 3rd series, p. 217) an article by Mr. J. D. Crace on Th. A. Cook's book, *Spirals in Nature and Art*, with the heading, "Leonardo and the Blois Staircase." Mr. Crace quotes different circumstances from which Mr. Cook is inclined to think that Leonardo da Vinci might be the designer of the celebrated open staircase of the Château de Blois.

Having, as far as I know, had the opportunity of publishing the least incomplete study on Leonardo da Vinci as architect that has hitherto been given,* and having also published two volumes on the *Architecture of the Renaissance in France*,† I may perhaps be allowed to state what I think of this idea of Mr. Cook, and allude to what I have published on the same subject.

(1) The so-called "aile de François I.," to which belongs the staircase, was built in its principal parts from 1515 to 1519. Leonardo da Vinci entered the service of François I. in Italy, 1515, but came to France with the King only in the beginning of 1516.

I would not like to say that these dates alone suffice to show that the supposition of Mr. Cook must absolutely be erroneous, but I do not believe it will ever be confirmed. I easily understand that one can arrive at such ideas. I have published the sketch of a plan for a castle on the road to Amboise,‡ by Leonardo, and also the studies for

* This study forms the 12th and 13th books of *The Literary Works of Leonardo da Vinci*, by Jean Paul Richter. London: Sampson Low, Marston, Searle, and Rivington, 1883, vol. ii. pp. 25–104, with 29 plates.

† "Die Baukunst der Renaissance in Frankreich," forming part of the *Handbuch der Architektur*, Stuttgart, 1898.

‡ In facsimile in J. P. Richter, vol. ii. pl. 81, fig. 2, and drawn as far as possible according to a scale in my *Renaissance in France*, fig. 16.

some tempietto at the angle of a terrace,* which, if I am not mistaken, has been supposed to have been intended for some place at the Castle of Amboise; and though there is no proof in favour of such a destination, it is quite possible, from its style, that it was made in connection with something of that sort.

(2) There is a second reason which is not in favour of Mr. Cook's idea. It is very probable that "the aile de François I." was executed from exact or slightly modified designs of another celebrated Italian master, Domenico da Cortona, called Boccador,† the famous architect of the ancient part of the Hôtel-de-Ville at Paris, destroyed in 1871, and rebuilt with slight modifications in the actual monument.

Boccador was proprietor of a house at Blois from 1512 to 1531, when he was called by the King to Paris for the Hôtel-de-Ville.‡

I have shown that there must have existed at that time at Blois something like a central office of architecture for the royal castles on the Loire. Chambord must have likewise been planned at that office, and, as we now can see, according to a slightly modified model of Boccador's; and as this architect was, with Fra Giocondo, amongst the twenty-two Italians whom Charles VIII. brought from Naples to Amboise, 1495, it becomes almost certain that he is the principal if not sole architect of the block with the staircase of Blois.

However, I have much insisted on the fact that the styles of those buildings and of the French Renaissance from Charles VIII. to Francis I. show a continual *compromise of Italian and French elements*, due to the taste of that time and to the collaboration of French and Italian masters. If the influence of the Italians was not so considerable as was formerly believed in France, it was evidently far greater than has been admitted for the past twenty years or so by M. Palustre and his school.

Jacques Sourdeau may have collaborated in the invention of the staircase of Blois. In every case he was the *builder* of that block.

Mr. Crace is quite right when he thinks that the *structure* of that staircase is entirely rooted in the French Gothic. The almost complete identity of thought that prevails in this staircase and in two others of Chambord will be seen in the parallel I gave of these three in the illustrations, figs. 81–84 of my *Renaissance in France*. The affinity, often identity, of the mouldings and profiles, combined with the historical dates, leads one directly to the conclusion that Domenico da Cortona (Boccador) was the *spiritus rector* at the centre of that office, and of those buildings designed under the influence of a continual compromise with the French taste of those days.

As to Mr. Crace's question, Did Leonardo ever erect any example of ornamental architecture? I must answer that I am not able to indicate any. But from the whole of the information and studies of Leonardo I was led to say that Bramante was the only architect who may be considered as superior to Leonardo, though naturally nobody can know how far Leonardo would have risen had he devoted himself as much to architecture as did Bramante.

On plates 81, 103, and 104 of J. P. Richter's work I have reproduced three figures which give some slight notion of Leonardo's ideas concerning the ornamental decoration in architecture. He was perfectly capable of giving details as beautiful as those of any master of that time.

H. VON GEYMÜLLER
[*Hon. Corr. M.*]

Baden-Baden, 30th March 1903.

* See J. P. Richter, vol. ii. pl. 80, fig. 4.

† The details concerning Boccador, the châteaux of Blois and Chambord, will be found in my *Renaissance in France*, vol. i. pp. 75, 114–122.

‡ See J. de Croy, *Nouveaux Documents, &c.*, Blois, 1894.

REVIEWS.

ANDREA PALLADIO.

Andrea Palladio, his Life and Works. By Banister F. Fletcher [*A.*]. *Illustrated by fifty-six Plates. Demy 4o. Lond.* 1902. [*George Bell & Sons.*]

The history of the art of the Renaissance in Italy is distinguished from that of Egypt, Greece, Rome, and the Middle Ages, in that it is the personal history of a number of artists who, all drawing their inspiration from the relics of Rome and reacting on one another, produced a new art, which may be said to have culminated, so far as architecture is concerned, in Palladio and his contemporary, Michel Angelo.

Many writers on the history of architecture have attempted, as did Rickman with Gothic architecture, to assign one form of building to a particular period, and have also often adopted a misleading nomenclature; or they have described a phase as "early" or "late," or "quattro cento" or "cinque cento"; or they have tried to prove that another form was peculiar to Florence, to Rome, or to Venice.

The truth is that in Italy, during the fifteenth and sixteenth centuries, each artist seized upon every new idea and created his own preferences in form and detail, so that the history of the art of the Renaissance must be the history of men.

No architect of that period more enthusiastically studied the monuments of Rome and the works of Vitruvius than Palladio, who by his superb genius gained a mastery in a new combination of units, and produced designs which remain as a legacy to architects for ever. His basilica and theatre at Vicenza, and his many

palaces in the same town, his Villa Capra and his villa at Meledo had more influence on the style of succeeding architects, especially those of England—Jones, Wren, Gibbs, Kent and Lord Burlington—than any other group of buildings by one author; while his churches of S. Giorgio and Il Redentore at Venice will always remain as examples of his mastery and science in the use of columns of different scale.

Palladio's own books are, however, his best "life and works," and Mr. Fletcher would have been wiser to have selected another less-known architect, for surely the only excuse for a new book is that it shall be better than those already existing; and here it is curious to note that although the author makes great use of the four volumes by Octave Bertotti Scamozzi, entitled *Les Bâtimens et les Desseins d'André Palladio*, published in 1796, he does not even mention in his book, or in the bibliography, that most fascinating work by the same writer, *Il Forestiere Istruito delle Cose più rare di Architettura della Città di Vicenza*, published in 1761, which is practically a life of Palladio, and which, although only half the thickness of Mr. Fletcher's volume, contains much larger and finer illustrations of Palladio's designs.

There are a good many evidences of haste or carelessness in the book, which Mr. Fletcher would do well to correct in any future editions, such as repetitions of the following nature: "This order consists of half pilasters with entablature *one-fifth of their height* backed against the main order, and is not a happy arrangement. The entablature to this order is *one-fifth of the height* of the pilasters, and is broken at each intercolumniation against the main pilasters" (p. 46).

He also rather annoys us by his too frequent use of "our master" or "our architect" when speaking of Palladio, and by using Scamozzi's Christian name, Bertotti, all through the book, so that by the time the reader has reached the end he has quite forgotten that it is Scamozzi who is being quoted.

On p. 8, in speaking of Rome we have the following: "The four '*gates*,' however, still stood, those of the Rotunda, St. Adriano, St. Cosino, and St. Agnes; the finest of all being the Rotunda, wherein the ancients endeavoured to imitate by art that kind of Corinthian metal in which the colour of gold prevailed." And what is Corinthian metal?

We are told (pp. 9 and 10) that Baccio d'Agnolo having decorated the Palazzo Barbolini with windows and doors of pedimented form, this new form of art was copied by Raphael and Michel Angelo, and that later Palladio followed their example, and it eventually became the principal characteristic of his style. On p. 16, Mr. Fletcher tells us that Palladio's architecture was "essentially columnar and not fenestral," which seems contradictory but more correct.

In describing the Thiene Palace (p. 43), the author speaks of the first floor as being ornamented with Composite pilasters, and later, on the same page, he says the same pilasters are Corinthian. He further says that the façade is surmounted by an attic, while on the following page he mentions Scamozzi's condemnation of Leoni for showing an attic which does not exist.

Of the Barbarano Palace (p. 48) we have the following: "An attic plainly treated with square windows crowns the whole building, the columnar lines being carried up and supporting statues." One is led to suppose that the description is of the actual building and not Palladio's published design; but these statues do not appear in the photographs of the building or in Scamozzi's drawing published in 1761.

The Casa del Diavolo at Vicenza has generally been considered a work of Palladio. Mr. Fletcher points out that Scamozzi, in his great book on Palladio, gave many reasons why he thought it was designed by Vincenzio Scamozzi, but he does not mention the fact that B. Scamozzi in his earlier book attributed it to Palladio and gave equally good reasons for doing so.

The house for the Conte Adrien Thiene, described by the author as one of Palladio's doubtful works, Scamozzi says is generally believed to have been designed by the Conte Marcantonio Tiene.

The following sentence (p. 79) seems badly worded: "The façade is unusual, the walls being ornamented with Corinthian pilasters on pedestals." As there is nothing unusual in decorating a façade with Corinthian pilasters on pedestals, a further description seems necessary.

In the account of the church of Il Redentore at Venice (p. 84), the side wings or aisles are said to be ornamented with Corinthian pilasters, and in the next sentence they are described as half-columns.

The portico of the church at Maser, also, is given as hexagonal instead of hexastyle (p. 87).

The meaning of the following description of Palladio's designs for S. Petronio at Bologna is not very clear: "In two of these designs a single Corinthian order of two dimensions is employed, resting on pedestals of different heights in each design. The height of the columns is the same in each case, the entablature and pedestals being varied in position."

In spite of the defects pointed out, we have to thank Mr. Fletcher for a very useful volume, especially as the editions of Palladio are now becoming difficult to obtain. It is not too large to handle comfortably, and contains a very good selection of reproductions from Leoni's and Scamozzi's plates, and some excellent photographs from the buildings themselves; the book is also well printed and bound, but there is no index.

FRANCIS W. BEDFORD.

AMIENS.

Bell's Handbooks to Continental Churches. Amiens. Crown 8o. 2s. 6d. [George Bell & Sons, York Street, Covent Garden.]

It may be said with truth that this, like other volumes of the series, is admirable. But, glancing through the pages, it appears that the tastes of the amateur have been considered rather more than those of persons who may wish to penetrate more deeply into the truly architectural mysteries of a mediæval cathedral. This does not necessarily mean that the substance appears superficial; not at all. But why should not the desires of an architect be more fully satisfied by even a small volume which deals with a strictly architectural subject? It might be too much to expect that for such a reasonable price we should be given material interesting alike to the technical student of architecture as a fine art, to the educated connoisseur, the historian, and the archæologist. Would it not, however, be possible to add, say, a chapter, eliminate some mediæval fables, and convert the series into genuine text-books for the use of students who wish to be architects? A few records of *details drawn to scale and figured* would be invaluable. Add to these some diagrams of the general composition and structure, also drawn to scale. Then the excellent selection of photographs would become intelligible. We could see what secret it was of size or curve in light or in shadow that made things beautiful. If we cannot turn to a section of an archmould in an arcade, of the base or cap of a pier, of a vaulting rib, or of a window-sill and jamb, with its tracery developments clearly shown, these pretty "views" are a mere idler's toys. They foster the wretched scrap-book method—or want of method—of many students. How few men there are who study one building well as a whole, how many who have painfully sketched and measured many buildings always in little bits, never one as a whole! If the examinations of the Institute severely required each man who sat for a test of his practical capacities to show a thoroughly intimate knowledge of one real work of architecture inside and out, from foundations to ridge, these volumes would become invaluable as guides of reference. A knowledge of structure, design, and history would be needed by this one claim. Then all the scraps could by degrees be collected and used as lasting illustrations of particular subjects for the benefit of all. Perhaps these few remarks may be admitted as a species of constructive criticism. The fact is this—these books are good, they are useful. May they not be better, more useful? They supply a want, a gap; can they not be made to fill up the void? Germs, seeds, let their scope be widened, and let them branch out to cover, protect, and foster the possible products to be nurtured in a larger field.

There is one small omission at which to cavil and so earn the title "critic." Page 11 says the reader will find the character of the vaulting used in the building shown on the plan at the end of the volume. He will be disappointed. There is no such useful diagram. It was forgotten.

HUBERT C. CORLETTE.

SPECIFICATIONS.

Specification for Architects, Surveyors, and Engineers when Specifying; and for all interested in Building. [Published by the Builders' Journal Proprietors, 9, East Harding Street, E.C.]

In spite of the fact that the art of building is not so rapid in its progression as to justify an annual edition of such a work as "Specification," there can be no doubt as to the individual usefulness of the six volumes which have now been published. It is obvious that as each edition is largely a reprint of its predecessor, with the addition of extra notes, articles, and illustrations, the earlier issues become more or less obsolete. In spite of this drawback, and it is a defect which is only apparent to the regular subscriber, the volumes regarded singly contain a vast amount of information of special interest to the architect, surveyor, and engineer.

Specification No. 6 (1903) is conspicuous in this respect, and the ease with which one can refer to any particular subject points to the excellence of the system of classification adopted by the compilers.

"Specification" must by now be so well established as to render a recommendation that it find a place in every architect's office belated advice. In the current issue one of the most striking of the many innovations introduced is the division (II.) devoted to reproductions of working drawings of new buildings. Here are to be found typical examples of several classes of buildings, such as public libraries, hospitals, municipal buildings, breweries, &c. The plans, &c., are to a good workable scale, and include many valuable constructional details which cannot fail to be appreciated by those who have hitherto found such special information inaccessible.

While noticing the greatly improved binding, one would like to see the interleaved advertisements relegated to their proper place at the end of the book.

FREDERICK CHATTERTON.

ALLIED SOCIETIES.

THE NORTHERN ASSOCIATION.

Durham College of Science: Mr. W. H. Knowles's Address to Architectural Students.

For many years the curriculum of the Art Department of the Durham College of Science has included classes for architectural students. During the past session these classes have received fresh impetus by the addition to the staff

of a teacher specially appointed to give instruction in architecture, and it is now possible to attend lectures at the College which cover the whole of the subjects necessary for the architectural pupil preparing for the examinations of the Royal Institute of British Architects. The results so far are exceedingly encouraging; the new facilities have been eagerly taken up by architectural students in the district. The lectures on "Architectural Form" delivered last session secured the very satisfactory average attendance of forty students. At the presentation of prizes to successful students in the Art Section of the College on 26th March a special address was delivered to the architectural pupils by Mr. W. H. Knowles, F.S.A. [*F.*]. He first expressed the grateful acknowledgments of local members of the architectural profession for the facilities offered their pupils by the College authorities, and he trusted that they would rise to a sense of their indebtedness by substantially contributing towards the maintenance of the Art Department. Addressing the students, Mr. Knowles said:

Your work during the past session shows a decided advance on previous years, and comprises many drawings of merit, and also a great number which could have been rendered with more appreciation for the subject and with greater care and precision of purpose. A report prepared by Mr. Plummer and myself bearing on the work lies in the room with the drawings. I will not, therefore, particularise here, but offer a few brief general remarks on the method and purpose of your studies.

In all your drawings put thought into every line, including the accessories, which should adorn and not detract from your study or design—nay, if the printing of titles and completion of details are executed in a slovenly manner it indicates a lack of real taste. All your studies should be thorough, careful, and accurate, rendered in a good line or wash, and with ample notes and comments. Do not be always dependent on T and set squares, but assiduously cultivate free-hand sketching, and learn to render in a few bold strokes the object to be reduced to paper. Prefer one good solid study to many indifferent and meaningless sketches.

As the labours and student days of the true architect are never-ending, begin early to train yourself in a methodical and workmanlike method of taking notes and making sketches and measured drawings. In the latter do not aim at prettiness, but attempt to grasp the intention and methods of the original workman, the significance and value of colour and material, the salient and interesting features, and the proportions of the various parts in relation to the general composition. Your zeal must be untiring; there is so little that an architect should not observe; no detail, artistic or constructive, that should escape him. Build up, therefore, portfolios on all the styles, on modern appliances and the allied arts. The information will ever afford pleasure, and will frequently be of great service.

So much for the methods of your general studies and draughtsmanship. Now a word regarding your acquaintance with ancient edifices, with the classic orders and the styles of mediæval architecture. The lectures are but a part of your training, and should be supplemented by careful reading of the books recommended by the Royal Institute of British Architects, from which copious notes in your own words should be made, accompanied by drawings of the mouldings, ornament, and other details.

The most effective manner of at once providing "evidences of study" for the Royal Institute of British Architects and of becoming familiar with architectural form is to measure old work, of which, although Northumberland and Durham are not architecturally rich, there are many fitting examples within easy distance of Newcastle. Such studies should comprise a comprehensive series of drawings carefully delineated, with sections and details to a larger scale.

Nothing but good can result from a thorough acquaintance with the work of past ages and of a knowledge of the forms and proportions of good and beautiful work. All the best architects of recent years have exemplified this. If we turn to Mr. Norman Shaw, to Mr. Ernest George, or to the late George Edmund Street, or to our own townsmen, the late Robert J. Johnson and William Searle Hicks, we shall find ready evidence of sound scholarship. Only the most painstaking study and application could have enabled Mr. Shaw, the author of so much delightful domestic work, to produce in another style that most successful building known as Scotland Yard. Similarly, Messrs. Johnson and Hicks, the authors of innumerable Gothic churches of excellent character, have given us in the Classical style two of the finest buildings in Newcastle—viz. the bank and the Assurance Company's offices, both in Collingwood Street.

Be assured, a broad and full knowledge will not induce imitation, but arm you against the absurdities of passing fashions, against the eccentricities of mediocrity and vulgarity, against that desire at all costs to be original, which, being interpreted, often means extravagant exaggeration and occasionally positive ugliness. Instead of producing imitative ability merely, I think that an abundant knowledge will be productive of a proper and critical sense of proportion, composition, and refinement, and will quicken your interest and enable you to work with sympathy and enthusiasm.

Ever remember that architecture is a noble and enduring art. Let, therefore, your ideal be an exalted one, and always aim, in the least of your efforts, to clothe your work with simplicity and beauty.

MINUTES. XI.

At the Eleventh General Meeting (Ordinary) of the Session 1902–03, held Monday 30th March 1903, at 8 p.m., Mr. John Slater, *Vice-President*, in the Chair, with 22 Fellows (including 8 members of the Council), 27 Associates (including 2 members of the Council), and visitors, the Minutes of the Meeting held 16th March 1903 [p. 284] were read and signed as correct.

The Hon. Secretary announced the decease of the following members:—John Bond Pearce, of Norwich, *Fellow*, elected 1879; Samuel Stenton Markham, of Guildford, elected *Fellow* 1856, transferred to the Class of *Retired Fellows* in 1897.

The following Associates attending for the first time since their election were formally admitted by the Chairman and signed the register—viz. Frederick Billinghurst Chester and Charles Edmund Lancaster Parkinson.

A Paper by Mr. Horace Porter [*A.*] on Fire Prevention and Fire Resistance was read by the author, and Mr. H. D. Searles-Wood [*F.*], *Hon. Sec. Science Committee*, read the report of the Science Committee on the Fire Offices' Regulations for Standard Fire-resisting Buildings. A discussion thereon ensued, and a vote of thanks for his Paper was passed to Mr. Horace Porter by acclamation.

With regard to the recommendations of the Science Committee, the Chairman stated that the Council would use their endeavours with the Fire Offices in order to bring about such revision of their rules and tariffs as seemed necessary for the encouragement of fire-resisting construction.

The proceedings then closed, and the Meeting separated at 10 p.m.

LEGAL.

Architects' Responsibilities.

GEARY, WALKER & CO. *v.* LAW & HARRIS.

In the Lord Mayor's Court, on the 23rd March, before the Recorder (Sir Forrest Fulton, K.C.) and a jury, the case of Geary, Walker & Co. (Ltd.) *v.* Law & Harris came on for hearing and was disposed of. The plaintiffs, a firm of wood-block flooring manufacturers, of 11, Queen Victoria Street, sued Messrs. Law & Harris, architects, of Northampton, for the sum of 7*l.* 19*s.* 1*d.* for work and labour done. Mr. Gaveen was counsel for the plaintiffs, and Mr. Pease represented the defendants. Mr. Lawrence Walker, managing director of the plaintiff company, said their company had entered into a contract to lay certain wood-block flooring at the Barry Road Schools, Northampton. In May last, after the work had been carried out, the defendants, who were the architects, complained that certain of the flooring required to be rectified. It was explained that the swelling of the flooring was due to the dampness of the building, and that if they were required to do any extra work they would be legally entitled to be paid for it. This complaint was made on 8th July, and the flooring rectified without charge. On 1st September they received a communication from the defendants to the following effect: "Will you please send a man to set this floor right?" and on 4th September a telegram was received from the same source: "Send a man at once to repair the flooring." As a consequence they sent a man to do the work required, and it was in respect of this work that they now sought to make the defendants liable. Cross-examined, the witness admitted that the work of laying the floor was to be done to the satisfaction of the architects. It was necessary that the defendants should give a certificate for the flooring work before the builder could get payment and settle with them, the plaintiffs. They had obtained payment for the bulk of their work through one Mr. Hawtin, the builder. It had since come to his (witness's) knowledge that his firm had sued the builder for the extra work they had done in rectifying the flooring. The action was settled, however, and the items in respect of the flooring withdrawn. Mr. E. Harrison, in the employment of the plaintiffs, said that in August he received a communication from his firm to proceed from Birmingham to Northampton to inspect some flooring work. The flooring he saw had swollen in consequence of the damp. Mr. Harris said he was perfectly well aware of the cause of the defect, and said he should require it put right. The result of the interview was that he (witness) said his firm would require payment for the extra work, and the defendant, Mr. Harris, said they were not to be paid. For the defendants Mr. Pease said the question to be decided was whether architects, in such a case as the present, could be made personally liable for work such as the plaintiffs had done. In the case in question the Northampton School Board had employed a builder who undertook to do the necessary work of erecting a building for a certain sum of money. The defendants were employed as architects to act between the building owner and the contractor, and it was their duty to see that the work was done properly, and from time to time to issue certificates as the work progressed. The plaintiffs, as sub-contractors, were employed to do certain flooring work. In the opinion of the architects the flooring laid by the plaintiffs was not properly done, and the architects called upon the plaintiffs to rectify it. There was no doubt that the defendants never undertook to be personally responsible for payment of the work at rectification. All the defendants had to do in the matter was to give a certificate when the work was done, and when once the certificate was given the School Board authorities would pay the builder, and the builder would settle with the plaintiffs. Mr. Sydney Frank Harris, member of the firm of Messrs. Law & Harris, architects, Northampton, said his firm were employed as architects in the erection of the Barry Road School, Northampton, being employed by the Northampton School Board. They had prepared the specification in which the plaintiff company's name was inserted to do the wood-block flooring. During the latter portion of the plaintiffs' work he (witness) refused to grant a final certificate until certain defects in the flooring were set right. He had told the plantiffs' representative that he could not certify for the work until the rectification was done. He also said that if the work was not done so that the schools could be opened by a certain date he would have to get the work done and charge the plaintiffs with it. He had sent the letter and telegram to the plaintiffs in September as a last chance for the work to be carried out by them.

The Recorder, in summing up the case to the jury, said that the case was the first of the kind that had ever been brought to his notice. The defendants were employed by the Northampton School Board to act as architects in the matter of the erection of a building to be used as a school. The defendants, as architects, were dissatisfied with certain flooring work which the plaintiffs had done, and their contention was that in requesting the plaintiffs to do the work properly they were merely acting in the ordinary scope of their authority as agents for the School Board. It was not a case of work having been ordered recklessly and without the authority of the defendants' employers. It was for the jury to say whether the plaintiffs had satisfied them that the defendants, in insisting that the work should be done by the plaintiffs, had made themselves liable for the account.

The jury found a verdict for the defendants, and judgment was entered accordingly.